of the Flores Sea on the west, is 900 fathoms beneath the surface.

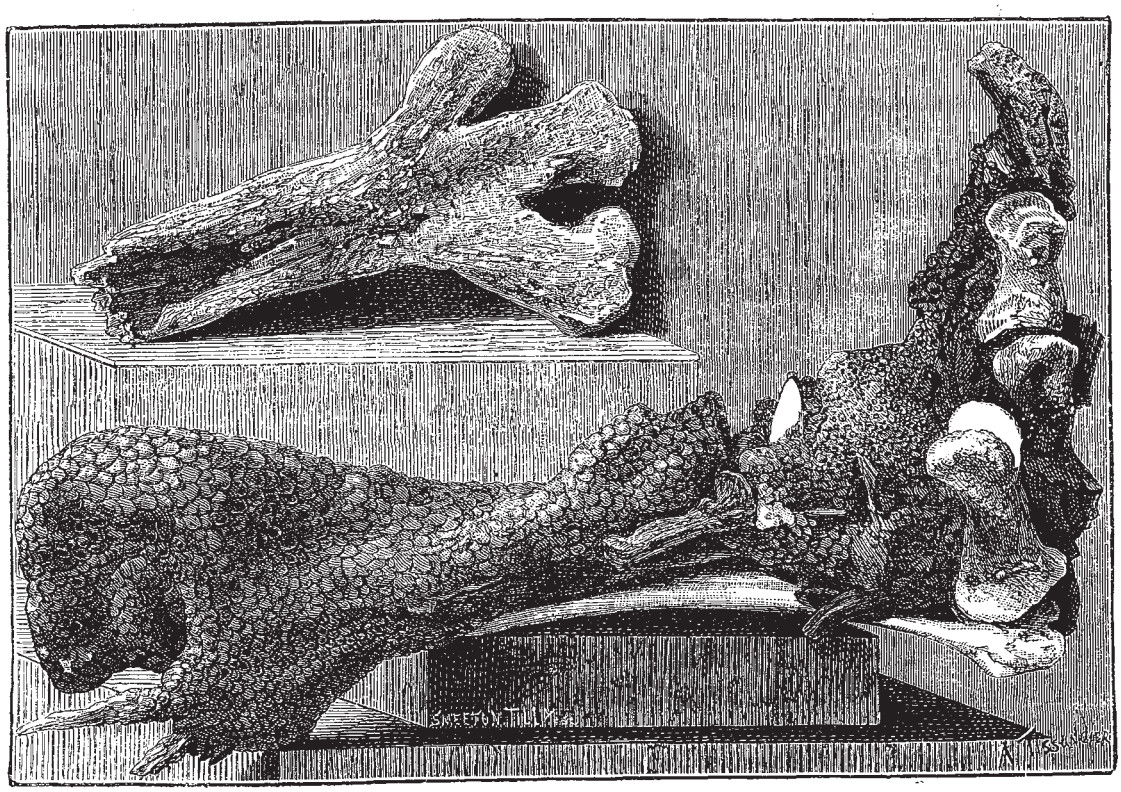
From Amboina we went to Ternate, and thence across the Molucca passage and into the Celebes Sea by the passage between Bejaren Island and the north-east point of Celebes. On the 13th we trawled and took serial temperatures near Great Tawallie Island. The trawl brought up several specimens of a very elegant stalked halichondroid sponge new to science, and the thermometer gave temperatures sinking normally to a bottom-temperature of 2°·04 C. On the following day we sounded in 1,200 fathoms, with again a normal bottom temperature of 1°·9 C. It seems, therefore, that the Molucca passage communicates freely with the outer ocean; it does so at all events to the depth of 1,200 fathoms, and most probably to the bottom, if it include greater depths.

In the Celebes Sea we had two deep soundings on the 20th, to 2,150 fathoms, and on the 22nd to 2600 fathoms. On both occasions serial temperature-soundings were taken, and on both the minimum temperature of 3°·7 C. (38°·7 F.) was reached at 700 fathoms. A passage of this depth into the Celebes Sea is therefore indicated very probably from the Molucca passage. This temperature corresponds almost exactly with that taken by Capt. Chimmo in the same area. We trawled on the 20th, and although the number of specimens procured was not large, they were sufficient to give evidence of the presence of the usual deep-sea fauna.

We reached Zamboanga on the 23rd, and on the 26th we passed into the Sulu Sea and trawled at a depth of 102 fathoms. On the 27th we sounded to 2,550 fathoms, and took a serial temperature-sounding. A minimum temperature of 10° C. was found at 400 fathoms, so that the Sulu Sea must be regarded as the fourth of this singular succession of basins cut off by barriers of varying height from communication with the ocean. This observation in the main confirmed those of Capt. Chimmo in the same locality. The minimum temperature reached was the same in both, but we appear to have found it at a somewhat higher level.

We arrived at Ilo Ilo on the 28th, and proceeded by the eastern passage to Manila, which we reached on the 4th of November.

The collections have been packed and catalogued in the usual way, and will be sent home from Hong Kong. We have had an opportunity during this cruise of making a very large number of observations of great interest. I believe I may say that the departments under my charge are going on in a very satisfactory way.



Moa Remains.

THE MOAS OF NEW ZEALAND

QUITE recently rumours have reached us from New Zealand to the effect that two living specimens of the colossal struthious birds, the Moas, have been captured in the province of Otago, which are to be taken to Christchurch. That the genus *Dinornis*, to which they belong, has been extinct for some time is the general impression, and it is based on evidence of no inconsiderable weight. Nevertheless, there are many reasons for the belief that it is not long since individuals of that ostrich-like group peopled parts of New Zealand. In 1870 Dr. Haast discovered kitchen-middens made up of fragments of Moas of different species, mixed up with bones of seals, dogs, and gulls, together with pieces of chalcedony, agate, &c., which evidently indicate that these gigantic birds were contemporaneous with the ancient human inhabitants of the islands. A human skeleton having been found with a Dinornis egg between its arms is also evidence in the same direction, as is the recent discovery of the neck of

one of these birds with the muscles and integuments preserved.

Several portions of the external covering of the bird have also been discovered, along with bones, which show signs of recent interment. Beside feathers, the complete skeleton in the museum at York has the integument of the feet partly preserved, from which it is evident that the toes were covered with numerous small hexagonal scales. We are now able to supplement our knowledge with a description of the covering of the tarsus from a specimen sent by Dr. Haast to Prof. Alphonse Milne-Edwards, which is to be seen in the Museum of Natural History at Paris. This specimen is figured, one-fourth the natural size, in the accompanying drawing, for which we have to thank the proprietors of our enterprising French namesake *La Nature*. It was obtained at Knobly Range, Otago, and belongs to the species *Dinornis ingens*. From it we learn that the tarsus, as well as the toes, was nearly entirely covered with small horny imbricate scales, and not with broad transverse scutes, as it might quite possibly have been. It is also evident that the hind toe, or hallux, which is not present in either the Ostrich, Rea, Emu, Cassowary, nor in some species of Moas, was articulated to the metatarsal segment of the limb a little above the level of the other toes. Those species of *Dinornis* which possess the hind toe, Prof. Owen includes in the genus *Palapteryx*.

Amongst the struthious birds, the Moas agree most with the Apteryx, in the presence (occasionally) of a fourth toe; and in their geographical distribution. They resemble the Cassowaries and the Emus most in the structure of their feathers; and in the structure of the skull differ from all to an extent which has made Prof. Huxley arrange them as a separate family of the Ratitæ. A knowledge of the anatomy of their perishable parts would be an invaluable assistance in the determination of their true affinities, but it is almost too much to hope that the material for such an investigation will ever present itself.

THE RECENT STORMS IN THE ATLANTIC

THIS subject has attracted the notice of the *New York Herald*, which, in an article on the 23rd January, remarks that "the successive gales appear to have been connected with the high barometer or polar air-waves which have recently swept across the northern part of the United States." Our contemporary says, moreover, that the last "great barometer fluctuation was followed by a storm centre which the weather reports recorded on the 19th inst. as then moving eastward over the Gulf of St. Lawrence. . . . In fact, the lesson apparently deducible from the recent steamer detentions and ship disasters we had to record is, that the severest cyclones may be looked for as the sequel phenomena of the great winter areas of high barometer and intense cold; or, in other words, the rising glass should be studied by the seaman as carefully as the falling glass."

Certainly, there is some truth in this assertion; but our contemporary ignores the startling fact that at the very same moment we had in Europe low pressure, southern gales, and high temperature. On the 15th a strong south-westerly gale was raging at Valentia. Evidently the danger is very great when a rising barometer in America is coupled with a falling barometer in Europe, or *vice versa*.

Unhappily, the Transatlantic Telegraph is not in use now for sending meteorological summaries between Europe and America. It is deeply to be regretted that the practice was discontinued, and we hope the recent disastrous gales will induce the nations on both sides of the great ocean to neglect no longer that useful channel of mutual information.

W. DE FONVIELLE

*THE PAST AND FUTURE WORK OF GEOLOGY**

ON the 29th ult. Prof. Prestwich, who, as our readers know, has succeeded the late Prof. Phillips in the chair of Geology at Oxford, gave his inaugural lecture in the Museum of the University. He commenced by paying a high and well-merited tribute to the value of the work, the wide attainments and character of his predecessor, Prof. Phillips, and giving a brief sketch of the aspect of geological science at the time the chair was established. Prof. Prestwich then proceeded to notice some of the larger features, whether on questions of theory or on questions of fact, by which the progress of geology has been marked, and which, while they may serve to show how much has been done, will yet indicate how much still remains to be accomplished.

"The geologist commences," Prof. Prestwich said, "where the astronomer ends. We have to adapt the large and broad generalisations of cosmical phenomena to the minuter details of terrestrial structure and constitution, which it is our business to study. The common origin of the solar system has been long inferred from the spheroidal figure of the earth and the relations of the planets to one another, and explained by evolution from an original nebulous mass; and geologists have had to consider how far such a hypothesis is in accordance with geological facts. The questions connected with the earliest stages of the earth's history are on the very boundary line of our science, but they have too important a bearing on its subsequent stages not to command our serious attention; and though obscure and theoretical, they serve to guide us to firmer ground. This nebular hypothesis has recently received from physicists corroboration of a most novel and striking character, equally interesting to geologists and astronomers.

"The wonderful discoveries with respect to the solar atmosphere, made by means of the spectroscope, have now presented us with an entirely new class of evidence, which, taken in conjunction with the argument derived from figure and plan, gives irresistible weight to the theory of a common origin of the sun and its planets; and while serving to connect our earth with distant worlds, indicates as a corollary what of necessity must have been its early condition and probable constitution.

"The whole number of known elements composing the crust and atmosphere of the earth, the lecturer went on to say, amount only to sixty-four, and their relative distribution is vastly disproportionate. It has been estimated that oxygen in combination forms by weight one-half of the earth's crust; silicon enters for a quarter; then follow aluminium, calcium, magnesium, potassium, sodium, iron, and carbon. These nine together have been estimated to constitute $\frac{993}{1000}$ of the earth's crust. The other $\frac{7}{1000}$ consist of the remaining fifty-five non-metallic and metallic elements.

"The researches of Kirchhoff, Angström, Thalèn, and Lockyer have now made known, that of these sixty-four terrestrial elements there are twenty present in those parts of the solar atmosphere called the "chromosphere" and "reversing layer," as the stratum which surrounds the photosphere is called from certain optical properties. They consist of †—

Aluminium.	Chromium.	Lead (?)	Sodium.
Barium.	Cobalt.	Magnesium.	Strontium.
Cadmium.	Copper (?)	Manganese.	Titanium.
Calcium.	Hydrogen.	Nickel.	Uranium.
Cerium.	Iron.	Potassium.	Zinc.

"Nor, with possibly two exceptions, does the spectroscope give any indication of unknown elements.

"While these phenomena afford such strong additional proofs of the common origin of our solar system, Mr. Norman Lockyer, basing his inquiries upon these and other facts recently acquired

* Inaugural Lecture of J. Prestwich, F.R.S., Professor of Geology in the University of Oxford. Delivered January 29.

† On analysing this list we find:—

1 Permanent Gas	Hydrogen.		
2 Metals of the Alkalies	Sodium.	Potassium.	
All the Metals of the Alkaline Earths	Calcium.	Strontium.	Barium.
3 Metals of the Zinc class	Magnesium.	Zinc.	Cadmium.
All the Metals of the Iron Class...	Manganese.	Cobalt.	Chromium
	Iron.	Nickel.	Uranium.
2 Metals of the Tin class	Tin.	Titanium.	
1 Metal of the Lead class (probably)			

The metals of the Tungsten, Antimony, Silver, and Gold classes are entirely unrepresented, while, if we except the metallic nature of hydrogen, there is not a single metalloid on the list, although they have been diligently searched for.